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WEEKLY STATION REPORTS

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DRY LAND AGRICULTURE

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REPORT FOR THE MONTH OF DECEMBER, 1938

HAVRE:

The month of December was quite mild, temperatures exceeding 32° on 24 days. With the exception of the last week, there were no subzero readings. The monthly mean temperature of 24° was 4° above normal. Precipitation, most of which occurred after the 25th, was approximately average, coming in the form of dry snow, which accumulated to cosiderable depth near the close of the month. Wind velocities were not exceedingly strong, except on the morning of the 25th when a thick dust haze obscured the sky.

For the most part winter cereals lacked snow protection and the surface of the ground became quite dry. It is too early to determine if this condition has injured winter grains. The beef cattle cow herd, with the exception of three days, grazed on stubble fields and native grass pasture thruout the entire month. Experimental feeding work with young stuff is now in progress. Cleaning up of the station shelter belt by W.P.A. has been completed. Considerable work was also done repairing ditches in the irrigated alfalfa fields and hauling rock preparatory to riprapping some of the badly washed places next spring.

Maximum temperature, 54°; minimum, -18°; precipitation 0.53 inch; snowfall, 12.1 inches.

JUDITH BASIN:

December was another month with less than normal precipitation. On the 8th 0.47 inch was received and during the remainder of the month only 0.04 inch. The precipitation for 1938 lacked 0.31 inch of equalling the 30-year average of 14.94 inches. The seasonal precipitation, April - September inclusive, was 10.64 inches, the highest since 1933, and lacked but 0.14 inch of the 30-year average. The best yields of crops in ten years were due more to timely distribution than to large or excessive amounts. Early crops were favored more than the later ones such as corn and potatoes.

The month was very windy, and were it not for the precipitation on the 8th even more soil blowing would have taken place. On nine days during the month the average wind velocity exceeded 10 miles per hour. On one day the average was better than 20 miles per hour. The monthly average was slightly over 7 miles per hour.

The month was warm except for the last week when a cold wave which extended over the northern plains and eastward. Temperatures were below zero for five days with a mimimum of -15°. Changes were very quick and abrupt. The cold spell was broken by a chinook which hurled temperatures from below zero up into the forties. The mean for the month was 28°.

Work continues on assembling reports and data. Outside work has been largely in feeding and caring for livestock. Most of the steers from the pasture trials have been disposed of, and the few remaining will no doubt be sold the first part of the coming month.

Maximum temperature, 56°; minimum, -15°; precipitation 0.51 inch.

HUNTLEY:

December was generally dry, mild, and windy. The only precipitation was 0.03 inch of rain on the 6th. The ground was free from snow throughout the period, which condition caused some hardship to winter wheat in the late or poor tillage plantings. The dry condition of the surface soil, together with other factors, has caused the ground to crack badly. In the seeded land, the cracks follow the drill rows, and roots and stems of seedling wheat plants have been injured. Wheat which got a good start last fall and made enough growth to cover the ground between the rows is not suffering so much as the weaker plants in stubbled ground.

Until the last week of the month the ground was not frozen hard enough to hinder plowing, and some of that type of work was done this fall which might otherwise have been left until spring. Farm stock still have the run of the fields, and grazing is still in progress on the winter ranges where grass is plentiful, but water is beginning to get short.

The total precipitation for the year was 14.87 inches, or 111 percent of the 29-year average of 13.43 inches. The fact that such a small increase in precipitation above the average resulted in grain yields double and triple the average returns, emphasizes the value of favorable distribution as well as amount in determining crop production.

Maximum temperature, 59°; minimum, -5°; precipitation, 0.03 inch.

DICKINSON:

Mild weather continued through December except for a cold spell from the 26th to the 30th. A minimum temperature of -28° was recorded on the 29th, but a temperature of 0 or lower was recorded on only 5 days. The mean temperature of 20.8° was 4.4° above normal. The month was the warmest December since 1931.

Precipitation amounted to only 0.18 inch. Fields were bare of snow most of the month, although drifts persisted in places. Snowfall was the lightest since 1923. Only about an inch of snow was left on the ground at the end of the month.

Precipitation in 1938 amounted to 16.65 inches or nearly 1.5 inches above normal. Early spring and fall were both dry, but nearly 65 percent of the annual precipitation fell during May, June, and July, so the distribution was as favorable as in an average year. The 47-year average precipitation increased to 15.19 inches, but the last 5-year average is only 12.51 inches, due to extreme drought in 1934 and 1936.

Grain crops were nearly or a total failure in 1938 over much of the area because of damage by grasshoppers and rust. Trees made an excellent growth, but fruit yields were generally low. Native and cultivated grasses yielded well, and much hay and roughage was stored. With an ample supply of feed and a good growth of grass on the ranges there has been some increase of breeding herds of livestock. The numbers of livestock on farms and ranches in the district are still below 5 years ago before drought made it necessary to reduce.

Maximum temperature, 51°; minimum -28°; precipitation, 0.18 inch.

MANDAN:

The month of December was mild until the last few days. There was little snow and wind. The total precipitation for the year was 15.04 inches.

Maximum temperature, 46°; minimum, -27°; precipitation, 0.18 inch; snowfall, 2.4 inches.

Results with vegetables and ornamentals during the season of 1938

Vegetables

Experiments included: (1) Vegetable tests under a 4-year rotation system in an acre garden plot. (2) Variety tests of a few of the more important vegetable crops and testing of new varieties. (3) Breeding work with sweet corn and tomatoes. (4) Asparagus variety and spacing tests.

The season on the whole was favorable for the growing of vegetables. The spring was unfavorable, being dry with some days of high winds, which caused damage to stands of several crops, but the abundant rainfall in early June overcame this in most cases. Good to excellent yields were obtained from all crops in the acre garden tests. A summary of the yields from this experiment was given in the newsletter of October 21. Especially good were peas, onions, tomatoes, vinecrops, early cabbage, and sweetcorn, and the poorest were beans, late cabbage, and carrots. The soil fertility in the acre garden plot, which has been continuously cropped since 1920, is still very good. The only limiting factor in producing good annual vegetable crops seems to be insufficient moisture during the growing season.

Insect pests have been few and easily controlled; confined mostly to cabbage worms, potato and blister beetles. Cutworm damage seems to be avoided by rotation and late fall plowing. There was an unusually heavy infestation of grasshoppers and plant lice in the 1938 season, but the injury to crops was comparatively light.

Variety tests

The more important variety tests included squashes, watermelons, tomatoes, beans, and peas.

Seven of the newer varieties of squash were grown. Buttercup and Golden Delicious were the earliest and best matured and of the highest quality.

Two strains of an early Siberian and one yellow fleshed variety of watermelon were grown. Two strains, one named Northern Sweet and the other Dakota Sweet, proved to be identical. Both are somewhat seedy but have sweet, tender flesh if picked at the right stage of ripeness.

Two of the newest varieties of tomatoes from the State College at Fargo, N. Dakota, names Red Skin and Allred, one Canadian variety, the Harkness, and two varieties introduced by U. S. Dept. of Agriculture, named Pritchard and Break O'Day were tested. Red Skin was the earliest, but very variable as to type of fruit. Most of the fruits were medium to small and very pointed. Vine growth was weak. Allred, medium early, fair-sized fruit, very similar to Bison, an older introduction from the State College.

Harkness, prolific vigorous grower with fruit small to medium, and distinctly acid flavor. Break O'Day, medium late, large fruit, mild flavor, too late, and a poor yielder for this section. Pritchard, medium early, prolific goodsized fruit, bearing over a long period. Best yielder of the five varieties tested. Can be recommended if a good strain of seed is obtained.

Three varieties of green podded and one wax podded variety of beans were included in this test. Brittle wax was very prolific and of good quality. Tendergreen was slightly better than stringless Green Pod, long a favorite in the green-podded class. Fordhook Favorite, a flat green podded variety, good yield but of somewhat inferior quality.

Two early and two midseason varieties of peas were tested. Radio was the best of the early and Fordhook Wonder of the midseason varieties.

Of newer varieties tested, the A. & C. cucumber is an exceptionally good general purpose variety.

Giant Sugar pea is the best of edible podded peas tested so far.

Vegetable breeding

Sweetcorn The season for this project was in general favorable. Germination and stands of all strains planted were good. The main object of this project is to produce inbred strains of Golden Bantam, drought resistant and immune to smut. The season proved valuable for this purpose, as drought susceptible strains soon failed, and smut developed in hitherto smut free strains. About 8 strains showed marked improvement along the lines desired, and selfing, sibcrossing, and crossing were concentrated on among a few of these.

Tomatoes About 1,400 plants of the three strains lately offered for introduction were grown. There was a good yield and little or no disease. Most of the crop was reserved for seed, as two varieties, the Mandan Earliana and Rosana are being introduced to the public through Oscar H. Will Co., Seedsmen, Bismarck, N. Dak., in 1939.

Asparagus This has proved a vegetable crop without a single failure for 20 years. The yield has varied slightly due to lack of rainfall in spring, but the quality has been excellent each year. The stands in the oldest plantings show but little impairment. The spacing experiments started six years ago, have as yet not attained their maximum growth, and only tentative conclusions about the best planting distance for dry land conditions can be drawn.

Ornamentals Aside from a few S. P. I. plants, there were no new additions to existing ornamental tree and shrubbery plantings. There was little winter killing, but the inflorescence of the majority of shrubs was badly injured by a late spring frost. Persian lilacs and spirea Van Houtei suffered the most. Hybrid rugosa roses, French hybrid lilacs, snowballs, and Hopa crabs showed the least injury. Of trees in the older plantings, spruces appeared most affected, due perhaps to exhaustion of soil fertility, as they are closely planted and now rather large specimens.

Perennial flowers suffered somewhat from the same late frost. The bloom of peonies was severely shortened by blasting of the buds and weakening of those that did develop. Other perennials of equal hardiness as

peonies suffered also, such as Hemerocallis, tiger lillies, and Darwin tulips had scarcely any bloom, although the plants recovered fairly well later.

The 1938 season was a favorable one for hardy chrysanthemum hybrids. As there were but light frosts during September and October, no injury to buds or blossoms was observed and most plants produced a wealth of bloom.

Hardy asters also were very outstanding among newer ornamentals at the station. Quite severe frosts had apparently no effect on buds or blooms, and the plants were literally smothered with flowers during September and October.

BELLE FOURCHE:

The weather was mild most of the month, but a sudden drop in temperature accompanied a strong wind on December 25, and subzero temperatures were recorded every day from December 26 to 30, inclusive. The velocity of the wind was extremely high on December 25 for 10 to 12 hours during the late afternoon and night, and extensive soil blowing occurred quite generally on fallow and corn stubble fields. Considerable soil drifting took place on several rotation plots lying in the path of wind blown soil from adjacent fields, but otherwise soil movement on the rotation field was comparatively slight.

The precipitation for December was approximately 65 percent of average, and the 0.20 inch received as rain, sleet, and snow on December 9 was the largest amount recorded in one day. The total precipitation for the year of 1938 was 9.85 inches. This is the third lowest annual precipitation in the 31 years of record.

Maximum temperature, 57°; minimum, -12°; precipitation, 0.29 inch.

ARCHER:

The temperatures during December were about average with no severe extremes. Snow covered the ground the greater part of the month, but it did not prevent the winter grazing of pastures. Some feeding was necessary.

During the latter part of the month the wind removed the greater part of the snow from the winter wheat on fallowed fields. This allowed the green foilage to freeze, however, the plants appear strong.

At the station rabbit damage to the winter cereals is slight. Only a few rabbits are seen, hunters having reduced their numbers.

Livestock are in good condition, and at present feed is plentiful.

Maximum temperature, 56°; minimum, -8°; precipitation, 0.42 inch.

NORTH PLATTE:

The precipitation for December was 0.16 inch, or 0.37 inch below normal. Since the middle of September 0.42 inch of precipitation has been recorded. The mean temperature for the month was above normal. Temperatures below zero were recorded on four days. High winds the day following Christmas caused considerable soil movement.

The total precipitation for the year was 20.86 inches, or 2.29 inches above normal. All but 1.44 inches fell during the 6-month growing period. Above normal precipitations were recorded for March, April, May, July, and September. The evaporation for the 6-month period was 0.94 inch above

normal.

The condition of the wheat has not changed much during the month, although the root system seems to be further developed. There is considerable browning of the leaves, but if weather conditions are not too severe in the next few months, the chances for a crop next year are good.

Maximum temperature, 61°; minimum, -5°; precipitation, 0.16 inch.

AKRON:

This month produced 0.46 inch of precipitation, enough to encourage a greatly harrassed winter wheat and rye crop. The normal for the month is 0.60 inch. Inspection in this section reveals that the winter wheat is gradually extending its secondary root system despite the winter weather. In a Holiday trip south across western Kansas to Woodward, Okla., winter wheat appeared to be in much the same predicament as here, suffering from insufficient moisture but still alive. These relatively uncovered winter wheat fields may encourage some severe wind damage, but outside of these questionable fields the soil seemed to be sufficiently covered all over the region to resist general soil blowing.

The precipitation at this station, all snow, fell largely the first part of the month and remained until the last few days, when it melted so that the fields again present a bare appearence. December weather on the whole was cool but pleasant, the coldest being -2° the night of the 26th.

The total 1938 precipitation was 15.32 inches which drops the 31-year average to 17.08 inches. It was stated in the 1923 bulletin that the most probable precipitation for the region was 17.0 inches. It is interesting to note that the average is seeking this level. Fifteen of the past 31 yearly precipitations have been above, and 16 below this average of 17.08 inches.

Messrs. Funk and Worthly again furnished pigs and feed, and chose this station as a central place for conducting a pig fattening experiment in cooperation with the State Agricultural College. Three lots of 10 comparable pigs were placed on the three following feeds shortly after the first of the month: Lot 1, shelled yellow corn; Lot 2, ground Coes grain sorghum; and Lot 3 a half and half mixture of ground corn and Coes. Simple mineral mixture, salt, and standard triple protein mixture is freely available to all lots. This should give a preliminary figure on the feeding value of the very heavy, white seeded grains produced by the Highland Kafir and the Improved Coes, in this section.

Maximum temperature, 59°; minimum, -2°; precipitation, 0.46 inch.

COLBY:

December was dry, warm, and windy. It was open and pleasant except for a few days when it was disagreeably chilly and murky. Precipitation was recorded on 4 days, a trace each time, except on the 16th when there was 0.02 inch of water from 0.2 inch of snow. The total snowfall was 0.3 inch. The temperature was appreciably above normal. There were 13 windy days, but only three of these were dusty with appreciable soil blowing. The last day of the year was almost like summer with a maximum temperature of 62°.

The highest temperature was 68° on the 5th. The lowest was -5° on the 27th, which was the only time the temperature was below zero. The ground was frozen only a very short time during the month.

Winter wheat, although frozen down, continued to make slow growth where moisture was available, but no brace roots were formed. The shortage of moisture in the surface soil was very acute as the year closed.

Precipitation, 1938, 17.82 inches; 51-year average, 17.43.

The year 1938 was, next to 1934, the warmest year on record at Colby.

HAYS:

To the drought that has prevailed since September 13 the month of December added a trace of moisture which fell in the form of a few flakes of snow December 16. The precipitation since September 13 still remains 0.33 inch. The total for the year, by the U. S. Weather Bureau is 22.11 inches.

The weather generally was clear and very fine except for the absence of moisture. It was very calm and mild except for a few chilly days and nights. December 4 and 26 were the only days when there was enough wind to make the air dusty and disagreeable. This did not cause any movement of soil in the fields in our locality.

Despite the prevalent worries over the condition of the wheat, it looks about the same as when reported upon a month ago. For most part it appears to be alive and the strongest plants have even made a little top growth, the upper part of which is brown due to the few cold days including minimum temperatures near zero and one drop to -6°. It is a surprise even to old veteran wheat growers, how a single slender root can pump sufficient moisture from the soil below to the surface to support a plant. All of the roots the plants have endeavored to send down have failed to enter the dry, hard layer of soil that lies between the plants and moisture below.

At the end of the month there is about 5 inches of ice on the creek. There is, however, no ice or frost in the soil. In order to learn something about the moisture condition of the soil after 100 days drought, a number of soil samples were collected December 30 and 31.

Maximum temperature, 66°; minimum, -6°; precipitation, trace.

GARDEN CITY:

The total precipitation for the month was 0.05 inch, which fell in the form of snow. This was considerably below normal. The total precipitation for the year was 15.91 inches, and the normal is 17.37 inches. Over 4 inches fell in September, which was too late to aid the sorghums to produce grain, but it was very beneficial for wheat seeding.

Temperatures were a little above normal during December. Wind velocities were also slightly above normal, and there were three days during which there was dust in the air. Dust storms this year were more numerous than last year, but not so severe. There were 93 dusty days compared with 72 last year. However, there were only 12 days this year when "bad" dust storms occurred, and there were none which would be termed "very bad". Last year there were 29 "bad" or "very bad" storms.

The wheat in this area and on the station is doing fairly well, considering the dryness of the past few months. That which was planted the

first part of September has produced a few secondary roots, but most of that which was planted after the last part of September has very few and usually no secondary roots.

Field work consisted of late fall listing and plowing.

Maximum temperature, 62°; minimum, -1°; precipitation, 0.05 inch.

TUCUMCARI:

December temperatures were unusually high until about the 20th, with normal readings throughout the remainder of the month. The monthly mean temperature of 40° was 3° above the 34-year average.

Precipitation of 0.55 inch was approximately normal. Wind movement was about normal, but short periods of high velocity caused some soil blowing where fields were powdery and ashy.

Outside work consisted of fence repair, cultivation of fields to prevent soil blowing, and wrapping of trees to prevent rabbit attack. Woven wire fencing is now being made into heading baskets.

Throughout the year a battle is waged against rabbits on this station. This is most successful in winter when large numbers are killed at night in the lights of an auto. The past six weeks a higher kill has been made than usual, records being kept of each night's hunting. Since November 14 there have been shot on the station 583 cottontail and jack rabbits, and 80 have been found dead from poisoned milo, making a total of 663. Usually an entire winter's kill will range from 300 to 500. Individuals from land surrounding the station migrate to station fields at night, so it cannot be assumed the above numbers are all station "natives".

The past year was the fifth in succession with crop yields below normal. It was the sixth dryest year on record, the third dryest in seasonal precipitation. Annual precipitation the past five years, 1934-38 inclusive, was 12.07 inches, compared with a 34-year average annual of 16.28 inches.

Dividing the 26 years of station history into two 13-year periods, we have the following striking contrasts in average annual and seasonal precipitation:

	Average seasonal (Apr.-Sept. Inc.)	Average annual
13 years, 1913-25	13.84 inches	18.48 inches
13 years, 1926-38	11.06 inches	14.38 inches

DALHART:

A 5 inch snow which fell soon after the middle of the month furnished 0.51 inch of water. This snow lay on the level, no drifting, and except for that in the shade of buildings, trees, etc., has melted and been absorbed by the soil. There were no days with excessive blowing nor of soil movement during the month. The mean temperature for the month was 2° above the average.

Winter rye on the early planting has excellent growth and complete ground cover -- that is, it is complete cover except where rabbits have eaten the top growth on a few plots. Winter wheat is also showing excellent growth and good ground cover; rabbit injury or grazing on wheat is likewise not uniform on the different plots. The one plot of oats was looking green before the snow, but since then it has a decided brown color.

Milo and kafir plots ranged in yield, in the main, between 5 and 7 bushels of grain per acre. The sorghum varieties on fallowed land gave yields ranging from near failure on disease susceptible varieties to above 40 bushels for the more adapted sorts. The quality of all grain from the early headed plots was excellent.

A preliminary study of the climatic factors for 1938 shows these results: The year was the second windiest on record with an average for the 12 months (in the pasture location) of 9.4 miles per hour at the 2-foot elevation; 1934 gave a higher average and 1935 ranks less than 1938. The precipitation for 1938 was 14.08 inches, while the 31-year average is 17.5 inches. A rather unusual grouping of the wet and dry years during the past 31 years is shown by the average for the consecutive groups, as follows:

Average for the first 10-year period is	15.78 inches
Average for the next 11-year period is	21.41 inches
Average for the last 10-year period is	14.93 inches
Average for the 31-year period is	17.50 inches

Maximum temperature, 74°; minimum, 10°; mean temperature, 35°; precipitation, 0.51 inch.

BIG SPRING:

Weather conditions during the past month have been very favorable for field work, although temperatures have been somewhat below normal. Precipitation was practically nil, with only one sprinkle of 0.02 inch. In fact the atmosphere has been so dry that it has been almost impossible to stack bundle sorghum without losing a large part of the leaves. Many farmers have been trying to stack during cloudy mornings, but as soon as the sun starts to shine it is necessary to stop. The soil is so dry that there has been no winter plowing or listing attempted in this section.

The fall plowing and listing of plots was completed during the early part of December, but the soil was so dry that it turned up very cloddy and uneven.

Cotton picking, or rather cotton pulling, throughout this section is just about completed and the gins will close this week, at least two months earlier than usual.

Rainfall during the past year has been very erratic and unevenly distributed. Although the total for the year was 21.32 inches or 2.22 inches above normal, 12.20 inches or more than half of this amount was received during the months of June and July, and only 2.37 inches have been received during the past five months. This later amount has been received in several showers ranging from a trace to 0.64 inch.

Station work during the month has consisted of completing cotton picking, threshing sorghums, ginning cotton, and hauling and stacking feed.

Maximum temperature, 80°; minimum, 14°; precipitation, 0.02 inch.

LAWTON:

Dry weather continued throughout December and mild temperatures prevailed. A minimum of 17° represents the low point for the winter to date. The monthly maximum of 78° was recorded on the 10th. Five showers from the 20th to the 25th produced the monthly total of 0.37 inch. The yearly total of 27.08 inches was 3.23 inches below the 65-year average; 58.82 percent of the yearly total was received in February, March, and May, and 79.98 percent was received from January 1 to June 30.

Small grains are in the poorest winter condition that has obtained since 1925. In most instances there is not enough growth to give the fields and plots a greenish cast. Volunteer oats show a little more growth. None of the winter grains has developed a normal root system, and hard freezes would undoubtedly be disastrous to oats and barley.

A scarcity of stock water prevails on the average farm.

WOODWARD:

Although precipitation for the period of August to December inclusive was less than half the 25-year average and the lowest on record, the 0.19 inch for December brought the total for the year up to 29.30 inches, which may be compared with 23.59 inches, the 25-year average. High winds blew at intervals during the month, but little local soil blowing was noted except on fields without cover and with smooth surface. A small amount of shifting was observed on the fertilizer plots, which no doubt was due to deep-furrows running parallel with high winds on sandy soil. Roads between plots and fields surrounding plots were tilled with a power springtooth having all but three shovels removed.

The 0.18 inch of moisture received from a 2-inch snow on December 20 and a few warm days following have helped wheat appreciably but only temporarily unless the moisture received will be sufficient for secondary roots to get to subsoil moisture.

Wheat has emerged to a fair stand on plots receiving early preparation. It is thin and spotted on plots beginning seedbed preparations in August, spotted on listed plots, and has not emerged on plots in rotations following 42-inch row crops, late preparation, and no preparation. Two to three drill rows have emerged in centers between 16½ foot sorghum rows. Wheat seeded on plots adjacent to sorghum or plots receiving no preparation and having immense weed growth following harvest, has not emerged on 2 to 4 foot strips along the sides next to such plots.

Making of grape cuttings was completed. Small quantities of numerous species and varieties of shrubs and vines have been planted in the green house for propogation.

Stratification and planting tests of various kinds of hard coated seeds have been started.

Shipments were made to 37 windbreak and horticultural cooperators in the southern part of the Southern Great Plains.

Field work consisted principally of threshing field sorghums, digging ditches for water lines for irrigation purposes, packing nursery stock for shipment, making nursery cuttings, building dam to keep water from road, stacking sorghum hay, and hauling manure on road-ways to prevent soil blowing.

E. G. Fitzpatrick and Orvel Stout started a soil survey of newly added land.

H. A. Daniels and J. W. Slaucer, Research Division of S. C. S., Guthrie, Okla.; Joseph Preston and H. C. Hyer, Extension Soil Conservationist of western Okla.; J. F. Brandon, Superintendent of Field Station, Akron, Colo.; Ralph H. Imler of the Bureau of Biological Survey; Mr. Shay of Soil Conservation Service and J. C. Ripperton of the University of Hawaiian Islands were station visitors.

Maximum temperature, 65°; minimum, 8°; precipitation, 0.19 inch.

SHERIDAN:

Except for a short period the latter part of the month December was comparatively mild. Temperatures were zero or below on only 4 days. Precipitation was about 75 percent above the station average, but was mostly in the form of rain, and there was no snow of consequence on the ground at any time. Wind movement was average with some soil blowing in spots on one day, but none of consequence on the station.

Aside from raking and burning a few Russian thistles, and extending the sewer ditch through the pasture to prevent overflowing some crop land below, cleaning grain occupied the most of the time during the month.

Maximum temperature, 57°; minimum, -7°; precipitation, 0.76 inch; mean temperature, 26°.

PENDLETON:

Temperatures during December were about normal. Precipitation for December was below normal. Precipitation in the form of rain or snow occurred on eleven days during the month, with 0.34 inch the greatest amount in any 24-hour period. About 4 inches of snow fell on the 21st and remained on the ground about two days.

All the fall sown grains have emerged with good stands and have a fine dark green color. Livestock in this section is in very good condition, range conditions are the best in years.

Maximum temperature, 63°; minimum, 10°.

Precipitation during calendar year 1938	-- 14.76 in.	10 yr. ave.	13.75 in.
Precipitation during December 1938	-- 1.10 in.	10 yr. ave.	1.89 in.
Precipitation September 1 to December 31 1938	-- 4.90 in.	10 yr. ave.	5.03 in.

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NOTE:

U. S. D. A. Technical Bulletin 636, Correlations between annual precipitation and the yield of spring wheat in the Great Plains, by John S. Cole, was received from the printer January 11. Franks were furnished for a small supply to be sent to each station.